PUBLIC-INTEREST FINDING FOR PROPRIETARY-MATERIAL USE

ROUTE: VAR   DES NO: VAR
PROJECT NO: VAR   COUNTY: VAR
PROJECT DESCRIPTION: Programmatic approval.
FHWA OVERSIGHT: ☒ YES ☐ NO
PROPRIETARY MATERIAL:
5 GHz Unlicensed Frequency Band Radios:

Tsunami MP/QB   Model 800 Series,

Tsunami MP8200   Model MP-8200 Series,

Tsunami GX   Model GX-Series.

Manufactured by Proxim Wireless Corporation.

1.   Description of Need:

The ITS Technology Deployment Division of the Indiana Department of Transportation is seeking approval for the equipment essential to the creation and maintenance of the INDOT ITS network.

Wireless communication devices are an integral part of the INDOT ITS network. Along with fiber optic cables they guaranty data flow between the field components and TMC. Radios are the preferred wireless communication devices because of the wide band, absence of the monthly usage fees (unlicensed frequencies), and low cost installation. Selection of Proxim radios out of multiple models, available on the market, is based on the fact, that only desired radios are meeting all requirements. Multitude of configurations allows designer select model guarantying required functionalities.

Required functionalities include:

- Provide stable reliable radio link.
- Provide radio link, capable of carrying multiple multicast and data streams.
- Provide separation of multiple networks in one physical location.
- Provide cost flexibility in one link (combination of high cost and low cost units).
- Provide ability of point-to-point and point-to-multipoint communication.
- Provide wide range of the bandwidth.

At the beginning of 2015 manufacturer announced the "End of Life" of all models 5054, which are the main wireless equipment in use for ITS purposes. Instead, they placed on the market MtP and QB 800 series radios, which have been tested and proven to be a direct replacement for 5054 and 5012 models.

2.   **Product History:** These devices have been introduced for testing in 2005 and were excepted and used ever since. Approximately 800 of Proxim radios are currently being used in Indiana. They demonstrate very high reliability (over 96% uptime) and maintainability. Desired product is currently listed on INDOT Approved Materials List for Traffic Signal and ITS Control Equipment under ITS Wireless Communication Equipment. Testing was conducted according the **ITM No. 948-10P**

3. Product Availability: Google search for 5GHz radios returns multiple devices, meeting some of the requirements, but not all. Testing results for various make radios are presented in the following matrix:

	Manufacturers / Specifications	Systech Telecom (Libra 5800)	Firetide	Encom Radio Services, Inc.	SmartBridges	Proxim	Novaroam
Frequency range	Non-Licensed, 5 GHz	Yes	Yes	Yes	Yes	Yes	N/A
Throughput – max	100 Mbps	Yes	Yes	Yes	Yes	Yes	No
Throughput – min	50 Mbps	No	N/A	Yes-900Mhz	No	Yes	Yes
Maximum data rate	1.5 Mbps	N/A	N/A	N/A	N/A	Yes	Yes
TCP/IP compatible		Yes	Yes	Yes	Yes	Yes	Yes
Communication mode	Point-to-Point	Yes	No - Mesh	Yes	Yes	Yes	Yes
	Point-to-Multipoint	Yes	No - Mesh	Yes	No	Yes	No
Power-over-Ethernet	120 VAC	Yes	Yes	Yes/No for 900MHz	Yes	Yes	Yes
	48 VDC	No	N/A	Yes	Yes	Yes	Yes
Management	Ethernet/Serial	Yes	Requires	Yes	Yes	Yes	Yes
	Web Based	No	purchase of	Yes-High End only	Yes	Yes	No
	Telnet	Yes	proprietary S/W	No	No	Yes	Yes
Mode of operation	Bridge	Yes	No	Yes	Yes	Yes	Yes
	Router	No	Yes	Yes	Yes	Yes	Yes
Availability		Available through distributor	Available through distributor	Available through distributor	Available through distributor	Available through distributor	Available through distributor
Performance record		High failure rate	In 6 month of testing had never worked properly	High failure rate and complicated management. Low end and high end radios are not compatible.	Low data rate and high failure rate.	Very reliable, easy to manage locally and remotely, high end and low end radios are compatible.	Do not have high end radios, require big antennas, inadequate tech support
Comments		Not acceptable	Not acceptable	Not acceptable	Not acceptable	Entered in approved materials list.	Not acceptable

4. Product Cost

4. Product Cost: Equipment available on the market does not provide required functionality and reliability as it shown in the table in paragraph 3. There is no equipment on the market to make cost comparison. The next closest product is the HD26342 priced at $975.00. However, this product does not meet broadband and reliability requirements.

5. Project Compatibility: Desired product is compatible with existing ITS hardware. Application matrix below describes which model can be used for which application. The lowest cost Proxim radio model is being selected for any particular project based on the technology needs.

Model \ Function	MP 820 Base Station	MP 820 Subscriber	QB-825	MP-8100	QB-8100	MP-8150-CPE	GX-Series	5054-PA50-23, 29	P, PL, PX, PLX
Base Station Unit, Regular Range (2 Mile)	X								
Base Station Unit, Extended Range (20 Miles)		X		X	X				
Subscriber Unit, Regular Range (2 Miles)			X						
Subscriber Unit, Extended Range (20 Miles)				X	X				
Subscriber Unit, Regular Range (2 Miles)						X			
Multicast capable	X	X	X	X	X	X	X		
Point – to – Point	X	X	X		X	X			
Point – to – Multipoint	X	X	X	X			X		
Broad Band, MHz	20	20	20	40	40	20	50		
Throughput, Mbps	100	100	100	300	300	100	204/102		
Type								Flat	Parabolic
Gain, db								23, 29	32
Cost	$1,736	$2001	$865	$1,800	$1,800	$400	$8,999-$23,000	$144	$350
Application	Nodes of Spur links, Relay	Nodes of Spur links, Relay	CCTV at the end of Spur	CCTV links, Relay	CCTV links, Relay	CCTV at the end of Spur	Relay sites		

6. **Maintenance:** Desired equipment is designed such a way, that most of maintenance functions: monitoring up/down time, restoring functionality, updating/upgrading – can be done remotely, which drives down maintenance cost. Training is available by manufacturer (as needed) and on line in Wiki Notes, accessible for tech personnel from any location in Indiana. Low. failure rate (less than 5%), compact design, and short order turn around time results in the minimal storage requirement.

7. **Engineering Analysis:** This application is programmatic by nature and unique not to a specific ITS project, but to the ITS architecture that is already in place. Proxim radios provide the best functionality of known similar products and are the most reliable.

8. **Expanded Economic Analysis:** There are over 800 units of various models of Proxim radio installed in Indiana to support ITS Network. Annual replacement rate, including damage done by lightning, is no more than 20 units a year, majority are the low cost 5012 units. While testing other models ITS Technicians were replacing 10% of installed radios at least once a year. Replacement of Proxim radios is predominantly driven by technology progress, rather than wear.

9. **Contractual or Performance Implications:** Use of desired items does not impose any restrictions on the use of other items on the contracts.

10. **Attach Supplemental Documentation:** Attached are:
    a) INDOT ITS Architecture;
    b) ITM # 948-10P 5GHz Unlicensed Frequency Band Radios.

11. **Length of Time that Approval is Effective:** ~~10/2013 until 10/2016~~ 1/2016 until 1/2019

JW MH

Prepared By: Konstantin Veygman

Field Engineer

INDOT-ITS Technology Deployment Division

Date:

Based upon the above finding, the use of the proprietary material listed is in the public interest and is hereby approved.

APPROVED: _John M. Petraha_
Deputy Commissioner, Engineering
& Asset Management, INDOT

Date: _1/7/16_

APPROVED: _Mohammad H_
for Division Administrator, FHWA

Date: _1/21/16_

Product Discontinuation Announcement

Jan, 2015

Dear Proxim Wireless Authorized Distributors,

Effective Jan 1st, 2015, Proxim Wireless is announcing the discontinuation of Tsunami® 5054, 5012, 4945, 2454, 4454, ORINOCO® 8494 and 8670 product line. The discontinued models will no longer be available for ordering. Please update your system and online product catalog accordingly.

Description	Proxim CPN	Proxim Comcode	Alternative Product
Tsunami MP.11 Model 5054-R-LR High Power Base Station Unit for extended range with Type-N Connector-US PSU	5054-BSUR-LR-US	5054-BSUR-LR-US	MP-8200-BSU-US or MP-820-BSU-100-US
Tsunami MP.11 Model 5054-R-LR High Power Base Station Unit for extended range with Type-N Connector- US/UK/EU PSU- WORLD	5054-BSUR-LR-WD	5054-BSUR-LR-WD	MP-8200-BSU-WD or MP-820-BSU-100-WD
Tsunami MP.11-R-LR; 5054-R-LR Hi-Power BSU w/int 23-dBi long range Antenna	77352	5054-BSUR-LR-P-US	MP-8250-BS1-US or MP-825-BS3-100-US
Tsunami MP.11 Model 5054-R-LR High Power Subscriber Unit for extended range with Integrated 23 dBi antenna- US/UK/EU PSU- WORLD version	5054-SUR-LR-WD	5054-SUR-LR-WD	MP-8250-SUR-WD or MP-825-SUR-50*-WD
Tsunami MP.11 Model 5054-R-LR High Power Subscriber Unit for extended range with Type-N Connector- US PSU	5054-SUA-LR-US	5054-SUA-LR-US	MP-8200-SUA-US or MP-820-SUA-100-US
Tsunami MP.11 Model 5054-R-LR High Power Subscriber Unit for extended range with Type-N Connector- US/UK/EU PSU- WORLD version	5054-SUA-LR-WD	5054-SUA-LR-WD	MP-8200-SUA-WD or MP-820-SUA-50*-WD
Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector -- US PSU	5054-BSUR-US	5054-BSUR-US	MP-8200-BSU-US or MP-820-BSU-100-US
Tsunami MP.11 5054-R, Base Station Unit Ruggedized 5Ghz, World	901-00105	5054-BSUR-WD	MP-8200-BSU-WD or MP-820-BSU-100-WD
Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna -- US PSU	5054-SUR-US	5054-SUR-US	MP-8250-SUR-US or MP-825-SUR-100-US
Tsunami MP.11a, Subscriber Unit Ruggedized 5GHz, World	901-00106	5054-SUR-WD	MP-8250-SUR-WD or MP-825-SUR-50*-WD
Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector -- US PSU	5054-SUA-US	5054-SUA-US	MP-8200-SUA-US or MP-820-SUA-100-US
Tsunami MP.11a, Subscriber Unit , N-Connectorized 5Ghz, World.	901-00107	5054-SUA-WD	MP-8200-SUA-WD or MP-820-SUA-50*-WD
Tsunami MP.11 Model 5012 Outdoor Subscriber Unit with integrated 18 dBi antenna, FCC Only	5012-SUR-US	5012-SUR-US	MP-825-SUR-100-US
Tsunami MP.11 Model 5012 Outdoor Subscriber Unit with integrated 18 dBi antenna, World	5012-SUR-WD	5012-SUR-WD	MP-825-SUR-50-WD
5012-SUR-H-RU, Tsunami MP.11 5012-SUR, 6 GHz, Horizontal Antenna, Russia	75134	5012-SUR-H-RU	
5012-SUR-V-RU, Tsunami MP.11 5012-SUR, 6 GHz, Vertical Antenna, Russia	75137	5012-SUR-V-RU	
Tsunami MP.11 5012-SUR, 5 GHz, Horizontal Antenna, India	74255	5012-SUR-H-IN	
Tsunami MP.11 5012-SUR, 5 GHz, Vertical Antenna, India	74256	5012-SUR-V-IN	
Tsunami MP.11 Model 5012 Indoor Subscriber Unit with 15 dBi Window Antenna, EU PSU	5012-SUI-WA-EU	5012-SUI-WA-EU	
Tsunami Quickbridge.11 Model 5054-R-LR Bundle- US/CAN PSU	5054-QB-LR-US	5054-QB-LR-US	QB-8250-LNK-US or QB-825-LNK-50*-US

Description			
Tsunami Quickbridge.11 Model 5054-R-LR Bundle- US/UK/EU PSU- WORLD version	5054-QB-LR-WD	5054-QB-LR-WD	QB-8250-LNK-WD or QB-825-LNK-50*-WD
Tsunami QuickBridge.11 Model 5054-R Bundle - US/CAN PSU	5054-QB-US	5054-QB-US	QB-8250-LNK-US or QB-825-LNK-50*-US
Tsunami QuickBridge 11 5054-R, 5GHz, World	902-00071	5054-QB-WD	QB-8250-LNK-WD or QB-825-LNK-50*-WD
Tsunami QB.11-R ; 5054-R, 5GHz, For INDIA	75152	5054-QB-IN	QB-8250-LNK-WD or QB-825-LNK-50*-WD
Tsunami MP.11 Model 4954-R Base Station Unit with Type-N Connector – US/CAN PSU	4954-BSUR-US	4954-BSUR-US	MP-8200-BSU-US
Tsunami MP.11 Model 4954-R Subscriber Unit with Integrated 21-dBi Antenna – US PSU	4954-SUR-US	4954-SUR-US	MP-8250-SUR-US
Tsunami MP.11 Model 4954-R Subscriber Unit with Type-N Connector – US PSU	4954-SUA-US	4954-SUA-US	MP-8200-SUA-US
Tsunami QuickBridge.11 Model 4954-R Bundle - US/CAN PSU	4954-QB-US	4954-QB-US	QB-8250-LNK-US
Tsunami QuickBridge.11 Model 2454-R Bundle - Australia PSU	2454-QB-AU	2454-QB-AU	N/A
Tsunami QuickBridge.11 Model 2454-R Bundle - China PSU	2454-QB-CN	2454-QB-CN	N/A
Tsunami QuickBridge.11 Model 2454-R Bundle - South Korea PSU	2454-QB-SK	2454-QB-SK	N/A
Tsunami MP.11 HS 4454 Green; includes one 245054-RC-BSU-G and one 5044-CA	901-00128	4454-G	N/A
Tsunami MP.11 HS 4454 Sand; includes one 245054-RC-BSU-S and one 5044-CA-S	901-00127	4454-S	N/A
ORINOCO 802.11a/b/g/n USB Adapter; US	76298	8494-US	N/A
ORINOCO 802.11a/b/g/n USB Adapter; World	76297	8494-WD	N/A
ORINOCO 802.11a/b/g/n USB Adapter; Japan	76299	8494-JP	N/A
ORINOCO AP-4000MR Tri-mode Outdoor Mesh Access Point EU- EU PSU	8670-MR-EU	8670-MR-EU	N/A

** *Alternative Products Where possible, Proxim Wireless recommends alternative products to replace those being discontinued. The recommended replacement product, if applicable, can be found in above table.*

Last Warranty Dates

To protect the customer's investment in these discontinued products, Proxim Wireless will continue to offer repair services for these radios until the dates listed below. Repair services may be subject to component availability.

Description	Last Warranty Date	Last Repair Date
Tsunami MP.11 Model 5054-R-LR High Power Base Station Unit for extended range with Type-N Connector- US PSU	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 5054-R-LR High Power Base Station Unit for extended range with Type-N Connector- US/UK/EU PSU- WORLD version	1st Jan 2016	1st Jan 2019
Tsunami MP.11-R-LR; 5054-R-LR Hi-Power BSU w/int 23-dBi long range Antenna	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 5054-R-LR High Power Subscriber Unit for extended range with Integrated 23 dBi antenna- US/UK/EU PSU- WORLD version	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 5054-R-LR High Power Subscriber Unit for extended range with Type-N Connector- US PSU	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 5054-R-LR High Power Subscriber Unit for extended range with Type-N Connector- US/UK/EU PSU- WORLD version	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 5054-R Base Station Unit with Type-N Connector – US PSU	1st Jan 2016	1st Jan 2019
Tsunami MP.11 5054-R, Base Station Unit Ruggedized 5Ghz, World	1st Jan 2016	1st Jan 2019

Tsunami MP.11 Model 5054-R Subscriber Unit with Integrated 23-dBi Antenna – US PSU	1st Jan 2016	1st Jan 2019
Tsunami MP.11a, Subscriber Unit Ruggedized 5GHz, World	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 5054-R Subscriber Unit with Type-N Connector – US PSU	1st Jan 2016	1st Jan 2019
Tsunami MP.11a, Subscriber Unit , N-Connectorized 5Ghz, World.	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 5012 Outdoor Subscriber Unit with Integrated 18 dBi antenna, FCC Only	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 5012 Outdoor Subscriber Unit with Integrated 18 dBi antenna, World	1st Jan 2016	1st Jan 2019
5012-SUR-H-RU, Tsunami MP.11 5012-SUR, 6 GHz, Horizontal Antenna, Russia	1st Jan 2016	1st Jan 2019
5012-SUR-V-RU, Tsunami MP.11 5012-SUR, 6 GHz, Vertical Antenna, Russia	1st Jan 2016	1st Jan 2019
Tsunami MP.11 5012-SUR, 5 GHz, Horizontal Antenna, India	1st Jan 2016	1st Jan 2019
Tsunami MP.11 5012-SUR, 5 GHz, Vertical Antenna, India	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 5012 Indoor Subscriber Unit with 15 dBi Window Antenna, EU PSU	1st Jan 2016	1st Jan 2019
Tsunami Quickbridge.11 Model 5054-R-LR Bundle- US/CAN PSU	1st Jan 2016	1st Jan 2019
Tsunami Quickbridge.11 Model 5054-R-LR Bundle- US/UK/EU PSU- WORLD version	1st Jan 2016	1st Jan 2019
Tsunami QuickBridge.11 Model 5054-R Bundle - US/CAN PSU	1st Jan 2016	1st Jan 2019
Tsunami QuickBridge 11 5054-R, 5GHz, World	1st Jan 2016	1st Jan 2019
Tsunami QB.11-R ; 5054-R, 5GHz, For INDIA	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 4954-R Base Station Unit with Type-N Connector – US/CAN PSU	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 4954-R Subscriber Unit with Integrated 21-dBi Antenna – US PSU	1st Jan 2016	1st Jan 2019
Tsunami MP.11 Model 4954-R Subscriber Unit with Type-N Connector – US PSU	1st Jan 2016	1st Jan 2019
Tsunami QuickBridge.11 Model 4954-R Bundle - US/CAN PSU	1st Jan 2016	1st Jan 2019
Tsunami QuickBridge.11 Model 2454-R Bundle - Australia PSU	1st Jan 2016	1st Jan 2019
Tsunami QuickBridge.11 Model 2454-R Bundle - China PSU	1st Jan 2016	1st Jan 2019
Tsunami QuickBridge.11 Model 2454-R Bundle - South Korea PSU	1st Jan 2016	1st Jan 2019
Tsunami MP.11 HS 4454 Green: Includes one 245054-RC-BSU-G and one 5044-CA	1st Jan 2016	1st Jan 2019
Tsunami MP.11 HS 4454 Sand: Includes one 245054-RC-BSU-S and one 5044-CA-S	1st Jan 2016	1st Jan 2019
ORINOCO 802.11a/b/g/n USB Adapter; US	1st Jan 2016	1st Jan 2019
ORINOCO 802.11a/b/g/n USB Adapter; World	1st Jan 2016	1st Jan 2019
ORINOCO 802.11a/b/g/n USB Adapter; Japan	1st Jan 2016	1st Jan 2019
ORINOCO AP-4000MR Tri-mode Outdoor Mesh Access Point EU- EU PSU	1st Jan 2016	1st Jan 2019

If you have additional questions, please feel free to contact your Proxim Distribution Sales Manager.

Sincerely,
Proxim Wireless

*Tsunami is a registered trademark of Proxim Wireless Corporation.

Tsunami® Multipoint 820 series

Wireless Product Portfolio

• *Tsunami® 8200 Series – PtP & PtMP, product line delivering 300 Mbps plus data rate*

• *Tsunami® 800Series Compact and robust, high performance, PtP & PtMP product line*

• *Tsunami® .11 Series -- Our best selling Point-to-point and multipoint product line*

• *Tsunami® GX-810- Carrier-class IP Ethernet bridge for voice and data backhaul for service providers and enterprise applications*

• *ORINOCO® AP - The industry's highest performance 802.11a/b/g/n access points*

Proxim Wireless is a global pioneer of broadband wireless systems that deliver the quadruple play of video, voice, data and mobility. Regardless of the application, our end-to-end product portfolio enables partners to custom-build the wireless solution that fits customer's specific needs. Our point-to-point wireless backhaul products are available through our extensive global channel networks.

Presenting Proxim's next generation video protection wireless solution

Proxim Wireless is a leader and an early innovator in wireless technology providing high-speed, long-range broadband wireless solutions. Leveraging the advantages of OFDM, MIMO radio innovations along with Proxim's proprietary Wireless Outdoor Routing Protocol (WORP®), the Tsunami® Multipoint 820 series is a feature rich evolving equipment specifically designed to address video protection market

The compact and robust form factor of Tsunami® Multipoint 820 series is an ideal solution for urban wireless deployments. It is suitable for pole mounting, next to video camera, in order to ensure citizen protection.

Tsunami® Multipoint 820 series is also adapted for in vehicle mounting and supports seamless roaming at very high speed.

World-class Performance

- Features a very small form factor and an outdoor rated IP67 Metal enclosure
- Available with 15 dBi integrated antenna or N-Type connectors
- 50Mbps (license upgradable to 100Mbps) or 100 Mbps of throughput, with maximum data rates of 300Mbps
- Provides flexible channel planning with support for 4.900 to 5.925 GHz
- Comes with a 2x2 MIMO high power radio capable of 26 dBm transmit power
- Dynamic bandwidth allocation for service tiers
- Seamless roaming up to 285 km/h (196 mph)
- Powered via 802.3at PoE or directly from 12 VDC source for in-vehicle installation

Video Ready and Highly Secure

- Service flow based Quality of Service with advanced packet recognition (layer 2, 3 or 4)
- Multicast traffic compliant (no performance reduction) and built in IGMP snooping
- Advanced encryption protects over-the-air transmission via AES-128
- Radio mutual authentication eliminates unauthorized use of the system by rogue subscriber units and man-in-the middle attacks
- MAC, Ether type, IP address packet filtering provides granular network security
- Uses Proxim's Wireless Outdoor Routing Protocol (WORP) to prevent eavesdropping
- Features highly-secure remote management via SSL, SSH and SNMPv3

Reducing Costs for Wireless ISPs

- License-free frequency bands worldwide provide reliable wireless broadband without the high cost of licensed frequencies
- Low-cost bundle including both radio and mounting kit provides the industry's most aggressive price point , enabling any deployment to enjoy a quick return on investment

Easy to Install

- Comes as a complete compact outdoor form factor offering unprecedented ease of installation
- Deployment tools include spectrum analyzer, antenna alignment and remote management configuration
- Non Line-of-Sight capability provided by Advanced Orthogonal Frequency Division Multiplexing (OFDM) along with 2x2 MIMO eases deployment in challenging areas
- Collocated Base Station synchronization ready (enabled via software upgrade in Q2-14)
- Connects to all existing Tsunami® MP.11, Tsunami® 8100 and Tsunami® 8200

	Tsunami® MP 820 Base Station Unit, 100 Mbps, MIMO 2x2, N-Type Connectors
	Tsunami® MP 825 Base Station Unit, 100 Mbps, MIMO 2x2, 15 dBi Antenna
	Tsunami® MP 820 Subscriber Unit, 50 Mbps (upgradable to 100 Mbps), MIMO 2x2, N-Type Connectors
	Tsunami® MP 820 Subscriber Unit, 100 Mbps, MIMO 2x2, N-Type Connectors
	Tsunami® MP 825 Subscriber Unit, 50 Mbps (upgradable to 100 Mbps), MIMO 2x2, 15 dBi Antenna
	Tsunami® MP 825 Subscriber Unit, 100 Mbps, MIMO 2x2, 15 dBi Antenna
	One auto MDI-X RJ45 10/100/1000Mbps Ethernet with PoE In
	WORP® (Wireless Outdoor Router Protocol)
	2x2 MIMO
	OFDM with BPSK, QPSK, QAM16, QAM64
	4.900 – 5.925 GHz (Subject to Country Regulations)
	40 MHz, 20 MHz, 10 MHz*, 5 MHz* channel bandwidths * Not applicable for DFS band
	MCS 0 to 15 for High Throughput mode (6.5 – 300 Mbps) with Dynamic Data Rate Selection
	BPSK, QPSK, 16-QAM and 64-QAM for legacy mode (6Mbps - 54Mbps)
	Up to 26 dBm (dual chain)
	0 – 15 dB, in 0.5 dB steps. Automatic TPC with configurable EIRP limit

Channel size	40 MHz	20 MHz	10 MHz	5 MHz
MCS 0	-88 dBm	-92 dBm	-93 dBm	-94 dBm
MCS 7	-72 dBm	-74 dBm	-75 dBm	-77 dBm
MCS 8	-88 dBm	-91 dBm	-93 dBm	-94 dBm
MCS 15	-69 dBm	-71 dBm	-72 dBm	-75 dBm

	Dynamic Channel Selection (DCS) based on interference detection
	Dynamic Frequency Selection (DFS) based on radar signature
	Automatic Transmit Power Control (ATPC) with EIRP limit support
	Synchronize internal clock to Pulse Per Second signal received from either GPS module connected to RS11 serial port or Ethernet Synchronization module connected to RJ45 ethernet port
MP-820-BSU-100/SUA-50+/SUA-100	Two N-type connectors
MP-825-BS3-100/SUR-50+/SUR-100	Integrated 15 dBi dual Polarized (H+V) panel antenna (14 dBi beyond 5.850 GHz)
	RS-232 serial (RJ11 to DB-9 dongle provided)
	Telnet and SSH, Web GUI and SSL/TFTP/SNMPv3
	SNMP v1-v2c-v3, RFC-1213, RFC-1215, RFC-2790, RFC-2571, RFC-3412, RFC-3414, Private MIB
	Syslog, sFlow® agent, SNTP and local time, Spectrum analyzer
	AES-CCM 128 bits
	Internal MAC Address Control List, Radius based Authentication (with VLAN and QoS provisioning)
	Bridging, Routing (RIP v2 and IP tunneling)
	IPv4 and IPv6 simultaneously
MP-820-BSU-100/SUA-100	Up to 100 Mbps, 10 subscriber max
MP-825-BS3-100/SUR-100	
MP-820-SUA-50+ or MP-825-SUR-50+	Up to 50 Mbps (license upgradable to 100 Mbps)
	DHCP Server & relay, NAT with 3rd ALGs, PPPoE end point with Proxy DNS
Asymmetric Bandwidth Control	Uplink and Downlink CIR Control "committed information rate" and MIR Control "maximum information rate" per service flow
Packet Classification Capabilities	802.1D/802.1Q/802.1p priority, IPTOS, VLAN ID, IP protocol, IP source/destination address, Ethernet source/destination address, source/destination port, and Ethertype
Scheduling	Best Effort, Real Time Polling Services
	802.1Q: Management VLAN, Transparent, Access, Trunk and Mixed mode, QinQ double tagging
	Via provided PoE injector
	8 Watt typical (15 Watt max)
	-40° to 55°C (-40° to 131° Fahrenheit)
	-55° to 70°C (-67° to 158° Fahrenheit)
	Max 100% relative humidity (non-condensing)
	180 km/h (112 mph)
	IP67

	DIMENSIONS	WEIGHT
MP-820-BSU-100/SUA-50+/SUA-100	11.81x10.83x5.31 in (300x275x135 mm)	7.93 lbs (3.6 kg)
MP-825-BS3-100/SUR-50+/SUR-100	11.81x10.83x5.31 in (300x275x135 mm)	7.27 lbs (3.3 Kg)
MP-820-BSU-100/SUA-50+/SUA-100	5.02x8.68x2.85 in (127.5x220.5x72.5 mm)	2.75 lbs (1.250 kg)
MP-825-BS3-100/SUR-50+/SUR-100	4.96x8.62x2.58 in (126x219x65.5 mm)	2.10 lbs (0.950 kg)

	UL 60950-1/22, CAN/CSA-C22.2 No. 60950-1/22, IEC 60950-1/22, EN 60950-1/22
	¤ One Tsunami® MP-820-BSU-100 with two N-type surge protected connectors
	Or One Tsunami® MP-825-BS3-100 with 15 dBi integrated antenna
	Or One Tsunami® MP-820-SUA-50+/SUA-100 with two N-type surge protected connectors
	Or One Tsunami® MP-825-SUR-50+/SUR-100 with 15 dBi integrated antenna
	¤ One 32 W power injector with reload button and country specific power cord
	¤ One Wall / Pole mounting kit
	¤ One Connector weatherproofing kit (includes all recommended weatherproofing material)
	¤ One Serial (RJ-11 to DB9) dongle
	¤ One Grounding kit
	¤ One Quick Installation Guide
	>350,000 hours & 1-year on parts and labor; ServPak Extended Support available.

APPLICATIONS

• **Wireless Broadband/ISP**
High service availability, superior subscriber per sector support and ultrafast 4G connectivity help ISPs to quickly scale their network coverage as well as meet the rising demand for high-bandwidth, multimedia services effortlessly

• **Last Mile Access**
Competitive broadband service access alternative to DSL or cable for residences and T1 or Ethernet for businesses

• **Security and Surveillance**
High definition IP-surveillance cameras for monitoring city streets, airports, bridges, seaports, transportation hubs, offices and warehouses
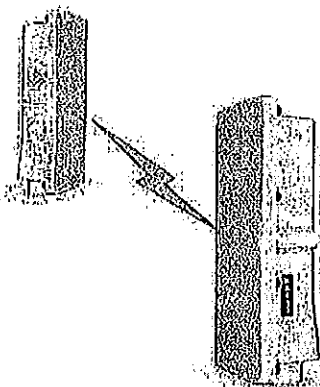
• **Metropolitan Area Networks**
Secure and reliable connectivity between city buildings

• **Emergency First Responders**
Critical information delivery such as medical data and video feeds during in-progress events

• **Enterprise Campus Connectivity**
Extend the main network to remote offices, warehouses or other buildings without leased lines

For detailed technical specifications, please go to http://proxim.com/products/point-to-multipoint/tsunami-mp-820-series

DS_0814_MP820_US

Tsunami Quickbridge® 825 series

Wireless Product Portfolio

• *Tsunami® 8200 Series*
*PtP & PtMP product line delivering 300
Mbps plus data rate*
• *Tsunami® 800 Series*
*Compact and robust, high performance,
PtP & PtMP product line*
• *Tsunami® .11 Series*
*Our best-selling Point-to-point and
multipoint product line*
• *Tsunami® GX-810 Series*
*Carrier-class IP Ethernet bridge for voice
and data backhaul for service providers
and enterprise applications*
• *ORINOCO® AP 8000 Series*
*The industry's highest performance
802.11a/b/g/n access points*

Proxim Wireless is a global pioneer of
broadband wireless systems that deliver
the quadruple play of video, voice, data
and mobility. Regardless of the
application, our end-to-end product
portfolio enables partners to custom-build
the wireless solution that fits customer's
specific needs. Our point-to-point wireless
backhaul products are available through
our extensive global channel networks.

Presenting Proxim's newest compact Point-to-Point wireless backhaul solution.

Proxim Wireless is a leader and an early innovator in wireless technology providing
high-speed, long-range broadband wireless solutions. Proxim introduces the Tsunami
Quickbridge® 825 series, an incredibly cost-effective, non Line-of-Sight Point-to-Point (PtP)
wireless backhaul solution. With this complete "Hop-In-a-Box" solution delivering up to 100
Mbps throughput, deployments of all sizes will enjoy a quick return on investment.

With excellent spectrum efficiency and a highly evolved prioritization platform tailored to
deliver voice, video and data applications, the Tsunami Quickbridge® 825 series satisfies
carriers, wireless service providers and Government organizations with requirements for
reliable cost optimized high performance wireless backhaul.

Leveraging the advantages of OFDM and the latest MIMO radio innovations, the Tsunami
Quickbridge® 825 series draws on Proxim's proprietary Wireless Outdoor Router Protocol
(WORP®) to deliver an unmatched outdoor wireless performance when compared to other
products in the market today.

World-class Performance

- Features a very small form factor and an outdoor rated IP67 Metal enclosure
- Available with 15 dBi integrated antenna
- 50 Mbps of throughput (license upgradable to 100 Mbps) with maximum
  data rates of 300Mbps
- Provides flexible channel planning with support for 5.150 to 5.925 GHz
- Comes with a 2x2 MIMO high power radio capable of 26 dBm transmit power
- Allows flexible bandwidth allocation for service tiers
- Spectrum analysis feature helps to study frequency bands for interference,
  and select a relatively low interference channel.

All-in-One Link with Security Features

- Built-In feature rich network protocols for Bridging and Routing
- Advanced encryption protects over-the-air transmission via AES-128
- Radio mutual authentication eliminates unauthorized use of the system
  by rogue End Point and man-in-the middle attacks
- MAC, Ether type, IP address packet filtering provides granular network security
- Uses Proxim's Wireless Outdoor Routing Protocol (WORP®) to prevent snooping
- Features highly-secure remote management via SSL, SSH and SNMPv3

Cost Effective and Ease of Installation for Quick Return on Investment

- Low-cost bundle including both radio and mounting kit provides the industry's
  most aggressive price point , enabling any deployment to enjoy a quick return
  on investment
- License-free frequency bands worldwide provide reliable wireless broadband
  without the high cost of licensed frequencies
- Comes as a complete "Hop-In-A-Box" compact outdoor form factor offering
  unprecedented ease of installation
- Non Line-of-Sight capability provided by Advanced Orthogonal Frequency
  Division Multiplexing (OFDM) along with 2x2 MIMO eases deployment in
  challenging areas

	Tsunami® QB 825 Link , 50 Mbps (upgradable to 100 Mbps), MIMO 2x2 , 35 dBi antenna (Two QB-825-EPR-50')				
WIRED ETHERNET	One auto MDI-X RJ45 10/100/1000Mbps Ethernet with PoE In				
WIRELESS PROTOCOL	WORP® (Wireless Outdoor Router Protocol)				
MIMO	2x2 MIMO				
MODULATION	OFDM with BPSK, QPSK, QAM16, QAM64				
FREQUENCY	5.150 – 5.925 GHz (Subject to Country Regulations)				
CHANNEL SIZE	40 MHz, 20 MHz, 10 MHz*, 5 MHz* channel bandwidths				* Not applicable for DFS Band
DATA RATE	MCS 0 to 15 for High Throughput mode (6.5 – 300 Mbps) with Dynamic Data Rate Selection				
TX POWER	Up to 26 dBm (dual chain)				
TX POWER CONTROL	0 – 15 dB, in 0.5 dB steps. Automatic TPC with configurable EIRP limit				
RX SENSITIVITY (DFS/UNII)	Channel size	40 MHz	20 MHz	10 MHz	5 MHz
	MCS 0	-88 dBm	-92 dBm	-93 dBm	-94 dBm
	MCS 7	-72 dBm	-74 dBm	-75 dBm	-77 dBm
	MCS 8	-88 dBm	-91 dBm	-93 dBm	-94 dBm
	MCS 15	-69 dBm	-71 dBm	-72 dBm	-75dBm
OTHER	Dynamic Channel Selection (DCS) based on interference detection				
	Dynamic Frequency Selection (DFS) based on radar signature				
	Automatic Transmit Power Control (ATPC) with EIRP limit support				
	Synchronize internal clock to Pulse Per Second signal received from either GPS module connected to RJ11 serial port or Ethernet Synchronization module connected to RJ45 ethernet port				
ANTENNA	QB-825-EPR-50'	Integrated 15 dB dual Polarized (H+V) panel antenna (14 dBi beyond 5.850 GHz)			
MANAGEMENT					
LOCAL	RS-232 serial (RJ11 to DB-9 dongle provided)				
REMOTE	Telnet and SSH, Web GUI and SSL, TFTP, SNMPv3				
SNMP	SNMP v1-v2c-v3, RFC-1213, RFC-1215, RFC-2790, RFC-2571, RFC-3412, RFC-3414, Private MIB				
OTHER	Syslog, sFlow™ agent, SNTP and local time, Spectrum analyzer				
SECURITY					
ENCRYPTION	AES-CCM 128 bits				
AUTHENTICATION	Internal MAC Address Control List, Radius based Authentication				
LAYER 2					
MODES	Bridging (support LACP through external switches), Routing (RIP v2 and IP tunneling)				
LAYER 3	IPv4 and IPv6 simultaneously				
THROUGHPUT	QB-825-EPR-50'	Up to 50 Mbps (license upgradable to 100 Mbps)			
GATEWAY FEATURES	DHCP Server & relay, NAT with Std ALGs				
QoS	Asymmetric Bandwidth Control	Uplink and Downlink CIR Control: committed information rate per service flow / Uplink and Downlink MIR Control: maximum information rate per service flow			
	Packet Classification Capabilities	802.1D/802.1Q/802.1p priority, IP ToS, VLAN ID, IP source/destination address, source/destination port, Ethernet source/destination address, IP protocol, and Ethertype			
	Scheduling	Best Effort, Real Time Polling Services			
VLAN	802.1Q: Management VLAN, Transparent, Access, Trunk and Mixed mode, QinQ double tagging				
POWER SUPPLY	Via provided PoE injector or directly from 12 VDC source through serial port				
POWER CONSUMPTION	6 Watt typical (15 Watt max)				
ENVIRONMENTAL SPECS					
TEMPERATURE					
OPERATING	-40° to 55°C (-40° to 131° Fahrenheit)				
STORAGE	-55° to 70°C (-67° to 158° Fahrenheit)				
HUMIDITY	Max 100% relative humidity (non-condensing)				
WIND LOADING	180 km/h (112 mph)				
WATER & DUST PROOF	IP67				
PHYSICAL SPECS		DIMENSIONS			WEIGHT
PACKAGED	QB-825-EPR-50'	11.81 x 10.83 x 5.91 in (300 x 275 x 185 mm)			7.27 lbs (3.3 Kg)
UNPACKAGED	QB-825-EPR-50'	4.96 x 8.62 x 2.58 in (126 x 219 x 65,5 mm)			2.1 lbs (0.950 kg)
SAFETY & STANDARDS	UL 60950-1/22, CAN/CSA-C22.2 No, 60950-1/22, IEC 60950-1/22, EN 60950-1/22				
WHAT'S IN THE BOX	One Tsunami® QB-825-LNK-50' with integrated antennas (Two Tsunami® QB-825-EPR-50')				
	Two 32 W power injector with reload button and country specific power cord				
	Two Wall / Pole mounting kit				
	Two Connector weatherproofing kit (includes all recommended weatherproofing material)				
	Two Serial (RJ-11 to DB9) dongle				
	Two Grounding kit				
	Two Quick Installation Guide				
MTBF & WARRANTY	>250,000 hours & 1-year on parts and labor; ServPak Extended Support available.				

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